POSTER SESSION

1162 Predicting Success of Cardiac Resynchronization

Tuesday, March 19, 2002, 9:00 a.m.-11:00 a.m.
Georgia World Congress Center, Hall G
Presentation Hour: 9:00 a.m.-10:00 a.m.

1162-103 Effect of Left Ventricular Function on Long-Term Left Ventricular Pacing and Sensing Threshold

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Background. The effect of left ventricular (LV) systolic function on the long-term LV pacing and sensing threshold is unclear.
Methods. We studied the effect of LV ejection fraction (LVEF) on the LV pacing and sensing threshold in 56 patients (pts)(mean age: 70.2±10.5 years) enrolled in study evaluating the safety and efficacy of the Aescula™ Left Heart Lead, Model 1055K (St. Jude Medical, USA). 49 pts (88%) and 7 pts (12%) were implanted for conventional pacemaker (sick sinus syndrome=14, heart block=20 or atrial fibrillation 9) and heart failure indications, respectively. 28 pts had LVEF ≤40% (Gp 1), and remaining 28 patients had LVEF ≥40% (Gp 2). The LV pacing and sensing threshold, and lead impedance were measured during implant and at 3 month (M) follow up.
Results. The LV pacing lead was successfully implanted in all pts without any dislodgement on follow-up. At implant, Gp 1 had a significantly lower R wave amplitude and lead impedance, but a similar LV pacing threshold vs. Gp 2 (Table 1). At 3 M, Gp 1 had a significantly higher LV pacing threshold but similar R wave amplitude and lead impedance vs. Gp 2 (Table 1).
Conclusions. Our results suggest that LV sytolic function have a significant impact on the long-term LV pacing threshold. Depsite the similar LV pacing threshold during implant, pts with impaired LV function had significant increase in LV pacing threshold on follow-up. This finding has important implication on programming of pacing output to ensure LV capture for pacing therapy in congestive heart failure.

		LV Pacing Threshold (V at 0.5 ms)		R Wave Amplitude (mV)		Impedance (Ω)	
	Mean LVEF (%)	Implant	3 M	Implant	3 M	Implant	3M
Gp 1	27±8	1.3±0.7	2.2±1.2^{+}	7.0±3.2	6.6±3.9	687±193	708±195
Gp 2	62±10	1.5±1.0	1.6±0.8*	9.7±3.4*	8.0±4.0	875±344*	739±147

(*p<0.05 vs. Gp 1, $^{+}$p<0.05 vs. Implant)

1162-104 Short-Term Effects of Cardiac Resynchronization on Brain Natriuretic Peptide Release in Patients With Systolic Heart Failure and Ventricular Conduction Disturbance

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Background: Brain natriuretic protein (BNP) is highly expressed in pathological hemodynamic conditions and correlates with left ventricular ejection fraction (EF), left ventricular wall stress and pressure or volume overload. Cardiac resynchronization by biventricular (BiV) pacing has recently been shown to improve hemodynamics acutely in patients (pts) with advanced systolic heart failure (HF) and left bundle branch block (LBBB). We investigated the effects of short-term BiV-pacing on BNP levels in pts with HF.
Methods: 12 pts. (7 male, 5 female) with severe HF (mean EF 24 +/- 5 %, NYHA II 3 pts, NYHA III 8 pts, NYHA IV 2 pt.) who underwent implantation of a BiV pacemaker were included in the study. 7 pts suffered from dilative and 5 from ischemic cardiomyopathy. BNP levels were determined with the Triage BNP test (Biosite Diagnostics, San Diego, USA). Blood samples for BNP were taken at rest on the day before surgery and 4-6 days after pacemaker implantation after continuous BiV pacing. The pacemaker was programmed to the atrial triggered BiV paced (VDD) mode immediately after implantation with an atrioventricular delay of 121 ± 21 ms. As BNP levels are elevated in patients with impaired renal function, Creatinine and blood urea nitrogen (BUN) levels were measured at the same time points. Left ventricular EF was determined echocardiographically.
Results: None of the pts had severely impaired renal funtion at baseline (Creatinine: 1,4 ± 0,4 mg/dl; BUN: 61 ± 21 mg/dl). Initial BNP levels were abnormal in all pts. with a mean of 537 ± 306 pg/ml (range 102-1030 pg/ml). After 4-6 days of continuous BiV pacing BNP levels decreased significantly to 255 ± 200 pg/ml (range 32-667 pg/ml, p<0,005). Creatinine and BUN levels showed no significant increase after surgery (1,4 ± 0,4 mg/dl, 62 ± 32 mg/dl; p=n.s.).
Conclusion: Cardiac resynchronization by BiV pacing leads to a significant decrease in BNP release as an indicator for improved hemodynamics and a better neurohormonal status after short term BiV pacing. Thus, monitoring BNP can potentially be used as a marker for the therapeutic effect of BiV pacing in pts. with advanced HF and ventricular conduction disturbance.

1162-119 Biventricular Pacing in Patients With Hypertrophic Cardiomyopathy: Beneficial Effect on Exercise Tolerance and Symptomatic Status

Christopher A. Rinaldi, Cliff A. Bucknall, Ron D. Simon, Pier Lambiase, Artur Baszko, Julian Bostock, Donna Elliott, Jaswinder S. Gill, *Guys and St Thomas NHS Trust, London, United Kingdom.*

Background: Biventricular (BIV) pacing is beneficial in patients with heart failure and prolonged QRS duration. We assessed its benefit in patients with hypertrophic cardiomyopathy (HCM) and intraventricular conduction delay with normal systolic function.
Methods: Seven patients aged 57±8yrs with HCM and prolonged QRS underwent BIV pacing with placement of electrodes in the right ventricular (RV) apex and a branch of the coronary sinus to allow left ventricular pacing. An atrial electrode was also inserted to achieve sequential BIV pacing with a short AV delay of 78 msecs. Symptomatic status and treadmill exercise tolerance was assessed after 1 month in each pacing modality
Results: There was a significant improvement in NYHA class with both active pacing modalities although the improvement appeared greater in BIV mode. When symptomatic status was assessed using the Minnesota Living with Heart Failure questionnaire there was only a statistically significant improvement with BIV pacing as compared to baseline (71±3 vs 40±33, p<0.05). Exercise duration increased with both active pacing modalities but only in BIV pacing did this reach statistical significance (231±171 vs 300±208, p<0.05). Conclusion: BIV pacing in patients with HCM and prolonged QRS has beneficial effects on both exercise tolerance and symptoms which exceeds that of RV pacing.

1162-120 Pacing Mode and Pacing Site Determine the Amount of Hemodynamic Response in Resynchronization Therapy

Juergen Vogt, Barbara Lamp, Johannes Heintze, Bert Hansky, Leon Krater, Frank Warzok, Reiner Koerfer, Dieter Horstkotte, *Heart Center North Rhine-Westphalia, Bad Oeynhausen, Germany.*

In resynchronisation therapy the posterolateral (PL) free wall has been identified as the optimal pacing site in contrast to the anterior or inferior wall. Although in the majority of clinical studies patients (pts.) are paced biventricular (BiV), no data are available on individual differences between left ventricular (LV) and BiV pacing.
We report on the preoperative hemodynamic test procedure in 86 heart failure pts. with sinus rhythm (age 62±9 years, 24 women, NYHA 3.1, 50 pts. with DCM, 34 pts. with CAD, QRS-width 192±22 ms, PQ interval 222±42 ms). Arterial pulse pressure (PP) was measured during atrio-LV and atrio-BiV pacing (VAT-mode) at different AV-delays using electrophysiology catheters in right atrium, right ventricular apex (RVA) and posterolateral coronary veins (CV). In 14 pts. 2 alternate PL CV and in 17 pts. RV outflow tract (RVOT) were tested.
13 pts were non responders (PP response below 10%). At the optimal AV-delay the best hemodynamic response was BV in 41, LV in 30 and BV with RVOT in 2 pts. The individual difference in PP increase between BV- and LV pacing mode at optimal AV-delay was 3 to 59%. 13 pts. showed response only by changing from BiV to LV (7 pts.), from LV to BiV (4), and from BiV+RVA to BiV+RVO (2 pts.). In 14 pts. with alternate PL veins the difference of PP increase between those tested veins was 4 to maximal 18%. In 4 pts. a sufficient response could only be seen by testing the second PL vein. The responders were implanted and programmed to the identified optimal mode and site.
Without preoperative testing of pacing mode and site 30% (26/86) of pts. would have been implanted without significant acute response. 43 % (32/73) of responders did not have their optimal hemodynamic response at BiV pacing. Thus preimplant testing of different sites including alternate PL CV and RVOT has an impact on implantation frequency (economics) and probably on clinical follow up and results of outcome studies.

ORAL CONTRIBUTIONS

857 Ventricular Arrhythmias: Brugada Syndrome and Other Repolorization Abnormalities

Tuesday, March 19, 2002, 10:30 a.m.-Noon
Georgia World Congress Center, Room 260W

10:30 a.m.

857-1 Molecular Autopsy for HERG Defects in Sudden Infant Death Syndrome

Michael J. Ackerman, Blake D. Anson, David J. Tester, Jeffrey A. Towbin, William Q. Stumer, Craig T. January, *Mayo Clinic/Mayo Foundation, Rochester, Minnesota, University of Wisconsin, Madison, Madison, Wisconsin.*

Background: Fatal arrhythmias from occult long QT syndrome (LQTS) may be responsible for some cases of sudden infant death syndrome (SIDS). Recently, we have established cardiac ion channelopathies as a pathogenic mechanism for SIDS, identifying defects in the cardiac sodium channel, *SCN5A*, in 2% of cases. Here, the prevalence and functional properties of putative SIDS-causing mutations in the cardiac potassium channel gene, *HERG* (*KCNH2*), are determined.
Methods: Postmortem molecular analysis was performed on 93 cases of SIDS or undetermined infant death identified by the Medical Examiner's Office of the Arkansas State Crime Laboratory between September 1997 and August 1999. Genomic DNA was extracted from frozen myocardium and subjected to *HERG* mutational analysis using polymerase chain reaction, denaturing high performance liquid chromatography, and DNA sequencing. Missense mutations were incorporated into the expression vector